

**DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM
(MPDES)**

Statement of Basis

Permittee:	City of Forsyth
Permit No.:	MT0021288
Receiving Water:	Yellowstone River
Facility Information:	
Name	City of Forsyth Wastewater Treatment Plant
Location	2800 Cedar Street
Facility Contact:	DeAnne K. Jonas, Director/Operator P.O. Box 226 Forsyth, MT 59327 406-346-7511 406-351-1426
Fee Information:	
Number of Outfalls	1
Outfall – Type	001-Minor POTW

I. Permit Status

The previous permit was effective February 1, 2000 and expired April 30, 2004. An Environmental Protection Agency (EPA) 2A application to renew the permit was submitted on October 31, 2003. In a January 8, 2008 letter, the Department requested the facility provide a DEQ 1 application and update the EPA 2A application. The updated application was received February 12, 2008.

II. Facility Information

A. Facility Description

The City of Forsyth wastewater treatment plant (Forsyth WWTP) is an extended aeration, activated sludge process utilizing an oxidation ditch. The plant was upgraded from a facultative lagoon and the new activated sludge and oxidation ditch system was put on line in 1978. The oxidation ditch is 155 feet long and 66 feet wide with a water depth of 10 feet. The volume of the ditch is 500,000 gallons. At the average daily design flow of 0.54 million gallons per day (mgd) and a maximum daily flow of 1.10 mgd, the ditch provides a retention time of approximately 22 hours. Secondary treatment is provided using one clarifier. An aerobic digester is used to treat sludge. The plant has a chlorine contact basin which is not currently being used because there are no pathogen effluent limits in the previous permit. Table 1 summarizes current design criteria for the facility.

Based on a June 19, 2002 Department inspection report, the facility maintains 12.37 miles of collection lines. Most of the collection system is approximately 70-80 years old. Four pump stations are maintained.

No identified industrial dischargers use the Forsyth WWTP.

The facility maintains an EPA Biosolids General Permit authorization (MTG650024) for disposal of sludge and biosolids.

Table 1. Current Design Criteria Summary – City of Forsyth

Facility Description:	
Extended aeration, activated sludge process utilizing an oxidation ditch. Chlorine disinfection is available but not currently used. Aerobic sludge digestion.	
Construction Date: 1977	Modification Date:
Design Year: 1978	(left blank)
Design Population: 5,000	Population Served: 1,900
Design Flow Average (mgd): 0.54 mgd	Design Flow, Peak (mgd): 1.1
Primary Cells: none	Secondary Cells: none
Minimum Detention Time (System) (days): 22 hours	
Design BOD ₅ Removal (%): 85	Design Load (lb/day): 850
Design SS Removal (%): 85	Design Load (lb/day): 1,100
Collection System: separate	
SSO Events (Y/N): N	Number:
Bypass Events (Y/N): N	Number:
Inflow Flow (mgd): unknown	Source: leaking sewer lines
Disinfection: available	Type: chlorine
Discharge Method: continuous	
Effluent Flow Primary Device: 60° V-notch weir	
Recording Device: totalizer	
Sludge Storage: three 5,000 square foot concrete drying beds	
Sludge Disposal: Rosebud county landfill	EPA Biosolids Permit Authorization: MTG650024

B. Effluent Characteristics

Table 2 summarizes monthly self-monitoring effluent data reported by the Forsyth WWTP during the period of record (POR) September 2002 through September 2007.

Table 2: Effluent Characteristics ⁽¹⁾ for the Period January 2002 through September 2007.

Parameter	Location	Units	Previous Permit Limit	Minimum Value	Maximum Value	Average Value	Number of Samples
Flow, Daily Average	Effluent	mgd	⁽⁶⁾	0.1413	1.7566	0.3106	54
Biochemical Oxygen Demand (BOD ₅)	Influent	mgd	⁽⁶⁾	139.2	453.5	241.1	55
	Effluent	mg/L	45/30 ⁽⁵⁾	1.7	12.8	4.3	55
	NA	% removal	85	96	99	98.2	55
	Effluent	lb/day	127.5 ⁽⁸⁾	--	--	--	--
Total Suspended Solids (TSS)	Influent	mg/L	⁽⁶⁾	65.2	350	200	55
	Effluent	mg/L	45/30 ⁽⁵⁾	1.5	6.1	3.3	54
	NA	% removal	85	91	99	98	56
	Effluent	lb/day	135 ⁽⁸⁾	--	--	--	--
Fecal Coliform Bacteria ^{(2), (3)}	Effluent	Org/100mL	⁽⁷⁾	7,050	97,600	32,672	32
pH	Effluent	s.u.	6.0-9.0	6.6	9.5	7.6	55
Temperature	Effluent	°C	⁽⁷⁾	--	--	--	--
Chlorine, Total Residual	Effluent	mg/L	0.5	--	--	--	--
Total Ammonia, as N, winter ⁽⁴⁾	Effluent	mg/L	⁽⁶⁾	--	--	--	--
Total Ammonia, as N, summer ⁽⁴⁾	Effluent	mg/L	⁽⁶⁾	--	--	--	--
Total Kjeldahl Nitrogen	Effluent	mg/L	⁽⁶⁾	--	--	--	--
Nitrate + Nitrite, as N	Effluent	mg/L	⁽⁶⁾	--	--	--	--
Total Nitrogen	Effluent	mg/L	⁽⁶⁾	--	--	--	--
		lb/day	140 ⁽⁸⁾	--	--	--	--
Total Phosphorus	Effluent	mg/L	⁽⁶⁾	--	--	--	--
		lb/day	35 ⁽⁸⁾	--	--	--	--
Dissolved Oxygen	Effluent	mg/L	⁽⁷⁾	--	--	--	--
Oil and Grease	Effluent	mg/L	10	--	--	--	--
Total Dissolved Solids	Effluent	mg/L	⁽⁷⁾	--	--	--	--

Footnotes:

- (1) Conventional and nonconventional pollutants only, table does not include toxics.
- (2) Sample period is April 1 through October 31.
- (3) Geometric mean
- (4) Winter period is November 1 through March 31; Summer period is April 1 through October 31.
- (5) Weekly average/Monthly average
- (6) No limit in previous permit; monitoring requirement only.
- (7) No monitoring or effluent limit in previous permit.
- (8) Nondegradation Annual Average Load Value, not a permit limit.

C. Compliance History

The permittee received a violation letter on July 10, 2007 for failure to conduct monitoring during February, March, April and May 2007. These Discharge Monitoring Reports (DMR) were received on September 13, 2007. No other violation letters were noted in the facility file. On October 16, 2007 the facility reported, in writing, that the digester overflowed due to a valve that was mistakenly left open. The overflow was cleaned up. Subsequent discussions between the director of the plant and operators reminded operators that double observation checks, with written documentation, must be made to prevent future overflows.

III. Technology-based Effluent Limits (TBELs)

The Montana Board of Environmental Review has adopted by reference 40 CFR 133 which define minimum treatment requirements for secondary treatment, or the equivalent, for publicly owned treatment works (POTW) (ARM 17.30.1209). Secondary treatment is defined in terms of effluent quality as measured by Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), percent removal of BOD₅ and TSS, and pH.

These requirements may be modified on a case-by-case basis for facilities that are eligible for treatment equivalent to secondary (TES) treatment [40 CFR 133.101(g)] or alternative state requirements (ASR) for TSS. To determine if a facility is eligible for TES the facility must meet the requirements of 40 CFR 133.101(g) summarized as follows:

- 1) The BOD₅ and TSS effluent concentrations consistently achievable through proper operation and maintenance of the treatment works exceed the minimum effluent quality described for secondary treatment (40 CFR 133.102).
- 2) The treatment works utilize a trickling filter or waste stabilization pond, and
- 3) The treatment works utilizes biological treatment that consistently achieves a 30-day average of at least 65 percent removal (40 CFR 133.101(k)).

Water quality must not be adversely affected by the application of equivalent to secondary treatment. Effluent limits for BOD₅ cannot be relaxed unless the permittee has demonstrated that the relaxed limits will not result in a violation of water quality standards in the receiving water.

The proposed TBELs satisfying the requirements of ARM 17.30.1209 are given in Table 4. These limits are based on:

1. The effluent limits for BOD₅ in the previous permit are a 7-day average of 45 mg/L and a 30-day average of 30 mg/L. These limits will remain in the renewed permit because data shows that the facility can consistently achieve these limits through proper operation and maintenance. (For the POR, the average BOD₅ concentration is 4.3 mg/L and the 95th percentile is 7.9 mg/L).

2. The effluent limits for TSS in the previous permit are a 7-day average of 45 mg/L and 30-day average of 30 mg/L. These limits will remain in the renewed permit because data shows that the facility can consistently achieve these limits through proper operation and maintenance. (For the POR, the average TSS concentration is 3.3 mg/L and the 95th percentile is 5.9 mg/L).

ARM 17.30.1345 [40 CFR 122.45(f)(1)] requires that effluent limits must be expressed in terms of mass (mass/time), except for certain parameters, such as pH or temperature. For municipal treatment plants, mass-based limits are based on design flow (discussed in Part II) for the facility.

Mass-based limits are calculated as follows:

$$\text{Load (lb/day)} = \text{Design Flow (mgd)} \times \text{Concentration (mg/L)} \times \text{Conversion Factor (8.34)}$$

BOD:

$$30\text{-d} \quad \text{Load} = 0.54 \text{ mgd} \times 30 \text{ mg/L} \times 8.34 = 135 \text{ lb/day}$$

$$7\text{-d} \quad \text{Load} = 0.54 \text{ mgd} \times 45 \text{ mg/L} \times 8.34 = 203 \text{ lb/day}$$

TSS:

$$30\text{-d} \quad \text{Load} = 0.54 \text{ mgd} \times 30 \text{ mg/L} \times 8.34 = 135 \text{ lb/day}$$

$$7\text{-d} \quad \text{Load} = 0.54 \text{ mgd} \times 45 \text{ mg/L} \times 8.34 = 203 \text{ lb/day}$$

Proposed mass-based TBELs for BOD₅ and TSS are listed in Table 3.

Table 3. Technology-based Effluent Limits				
Parameter	Units	Average Monthly Limit ¹	Average Weekly Limit ¹	Rationale
BOD ₅	mg/L	30	45	40 CFR 133.102(a)
	lb/day	135	203	
	% removal	85 ²	--	
TSS	mg/L	30	45	40 CFR 133.102(b)
	lb/day	135	203	
	% removal	85 ³	--	
pH	s.u.	6.0-9.0 (instantaneous)		40 CFR 133.102 (c)

1. See Definitions section at end of permit for explanation of terms.
 2. The arithmetic mean of the values for BOD₅ for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same time during the same period (85% removal).
 3. The arithmetic mean of the values for TSS for effluent samples collected in a period of 30 consecutive days shall not exceed 35% of the arithmetic mean of the values for influent samples collected at approximately the same time during the same period (85% removal).

A. Nondegradation

The provisions of ARM 17.30.701, *et seq.* (Nondegradation of Water Quality) apply to new or increased sources of pollution [ARM 17.30.702(18)]. Sources that are in compliance with the conditions of their permit and do not exceed limits established in the permit, or as determined from a permit previously issued by the Department, are not considered new or increased sources. In the previous Statement of Basis (SOB), the Department calculated mass-based load values for BOD₅, TSS, total nitrogen and total phosphorus [Nondegradation Threshold Values, March 1999]. Any increase above these amounts is subject to the provisions of the Nondegradation Policy (75-5-303, MCA).

The permittee was not required to report load data for these parameters during the POR so a comparison of the nondegradation loads to the actual loads can not be made. Increased monitoring proposed in this renewed permit will require the facility to calculate loads discharged. The discharge does not constitute a new or increased source for the purposes of Montana Nondegradation requirements.

Table 4. Nondegradation Loads

Parameter	Allocated Load (lbs/day)
BOD ₅	127.5
TSS	135
Nitrogen	140
Phosphorus	35

IV. Water Quality-based Effluent Limits

A. Scope and Authority

Permits are required to include water quality-based effluent limits (WQBEL) when technology-based effluent limits are not adequate to protect state water quality standards (40 CFR 122.44 and ARM 17.30.1344). ARM 17.30.637(2) states that no wastes may be discharged that can reasonably be expected to violate any state water quality standards. Montana water quality standards (ARM 17.30.601, *et seq.*) define both water use classifications for all state waters and numeric and narrative standards that protect those designated uses. New sources, as defined in ARM 17.30.703(16), are subject to Montana Nondegradation Policy (75-5-303, MCA) and regulations (ARM 17.30.701, *et. seq.*).

B. Receiving Water

Treated wastewater is discharged to a man-made conveyance ditch (about 1¼-miles long) that empties into the Yellowstone River. The conveyance ditch is not considered state water because it was constructed solely for transporting treated wastewater [75-5-103(29)(b)(i)].

The Yellowstone River is classified as B-3 according to Montana Water Use Classifications [ARM 17.30.611(1)(c)(i)]. Waters classified B-3 are to be maintained suitable for drinking, culinary, and food processing purposes, propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers; and agriculture and industrial water supply. The B-3 classification for the receiving water is consistent with the previous permit. The Yellowstone River in the vicinity of the discharge is considered high quality water pursuant to Montana's Nondegradation Policy and degradation of high quality water is not allowed unless authorized by the Department under 75-5-303(3), MCA.

The Yellowstone River is located within the Lower Yellowstone watershed identified as United States Geological Service (USGS) Hydrological Unit Code (HUC) 10100001 and Montana Stream Segment MT42K001_010. The Yellowstone River in the vicinity of the discharge is on the 1996 303(d) list as impaired for these uses: aquatic life support, drinking water supply, recreation, swimmable and warm water fishery. The probable causes of impairment are: metals, nutrients, other organics, salinity/TDS/chlorides, suspended solids and unionized ammonia. The probable sources of impairment are: agriculture, industrial point sources, irrigated crop production and municipal point sources. The Yellowstone River in the vicinity of the discharge is listed on the 2006 303(d) list as partially supporting aquatic life and warm water fishery. The probable causes of impairment are: alteration in stream-side or littoral vegetative covers, copper, lead, nitrate/nitrite, suspended solids, total dissolved solids and zinc. The probable sources of impairment are: agriculture, irrigated crop production, rangeland grazing, stream bank modifications/destabilization, sources unknown and municipal point source discharges.

The USGS maintains a monitoring station (USGS 06295000) upstream from the Forsyth WWTP on the Yellowstone River in Forsyth. The station is located on the right river bank 0.3 miles downstream from the U.S. Highway 12 bridge in Forsyth at river mile 238.2. The 7Q10 for this station, based on 24 years of record, is 2,560 cubic feet per second (cfs). This 7Q10 value will be used to calculate effluent limits in this permit.

C. Applicable Water Quality Standards

Discharges to surface waters classified B-3 are subject to the specific water quality standards of ARM 17.30.625 (March 31, 2006), Department Circular DEQ-7 (February 2006), as well as the general provision of ARM 17.30.635 through 637. In addition to these standards, dischargers are also subject to ARM 17.30 Subchapter 5 (Mixing Zones, November 2004) and Subchapter 7 (Nondegradation of Water Quality, June 30, 2004).

ARM 17.30.635(4) requires that the design condition for disposal systems must be based on the 7-day average flow of the receiving water which is expected to occur on average once in 10-years (7Q10). More restrictive requirements may be necessary due to specific mixing zone requirements.

D. Mixing Zone

A mixing zone is an area where the effluent mixes with the receiving water and certain water quality standards may be exceeded [ARM 17.30.502(6)]. The Department must determine the applicability of currently granted mixing zones [ARM 17.30.505(1)]. Mixing zones allowed under a permit issued prior to April 29, 1993 will remain in effect unless there is evidence that previously allowed mixing zones will impair existing or anticipated uses [ARM 17.30.505(1)(c)].

In accordance with ARM 17.30.517(1)(b), acute water quality standards for aquatic life may not be exceeded in any portion of the mixing zone unless the Department finds that allowing minimal initial dilution will not threaten or impair existing uses. The discharge must also comply with the general prohibitions of ARM 17.30.637(1) which require that state waters, including mixing zones, must be free from substances which will:

- (a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
- (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;
- (c) produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
- (d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and
- (e) create conditions which produce undesirable aquatic life.

Although certain standards may be exceeded in the mixing zone, an effluent in its mixing zone may not block passage of aquatic organisms nor may it cause acutely toxic conditions [ARM 17.30.602(16)]. No mixing zone will be granted that will impair beneficial uses [ARM 17.30.506(1)]. Acute standards may not be exceeded in any part of the mixing zone [ARM 17.30.507(1)(b)]. Aquatic life chronic, aquatic life acute and human health standards may not be exceeded outside of the mixing zone [ARM 17.30.507(1)(a)].

A standard mixing zone may be granted for facilities which discharge less than 1 million gallons per day (MGD) or when mixing is nearly instantaneous [ARM 17.30.516(d)].

Nearly instantaneous mixing is assumed if the discharge is through an effluent diffuser, when the mean daily flow exceeds the 7-day, 10-year low flow (dilution ratio <1) or the permittee demonstrates through a Department approved study plan that the discharge is nearly instantaneous. A nearly instantaneous mixing zone may not extend downstream more than two (2) river widths. Effluent discharges which do not qualify for a standard mixing zone must apply for a source specific mixing zone in accordance with ARM 17.30.518 and must conform to the requirements of 75-5-301(4), MCA which states that mixing zones must be the smallest practicable size; have minimal effects on uses; and, have definable boundaries. ARM 17.30.515(2) states that a person applying for a mixing zone must indicate the type of mixing zone and provide sufficient detail for the Department to make a determination regarding the authorization of the mixing zone under the rules of Subchapter 5.

If the discharge from the Forsyth WWTP was flowing into the main channel of the Yellowstone River the dilution ratio of receiving water to effluent would be 3,062:1 [2,560 cfs/0.836 cfs (0.54 mgd)]. However, an inspection on January 17, 2008 showed that during the winter (low flow), there is no immediate mixing of the receiving water and discharge until a considerable distance downstream. Best Professional Judgment was used to define the mixing zone in the previous permit because there were no available field data. The mixing zone was defined as a segment of the Yellowstone River extending from the discharge point downstream 1¼ miles to a point at the section boundary in the NE¼, NE¼ of Section 18, Township 6N, Range 41 East. No basis for this mixing zone was given.

Since the discharge is a shore-hugging plume; at certain times of the year there is no immediate mixing of the discharge with the receiving water (until a considerable distance downstream); and, the discharge velocity of the outfall is low, mixing is considered incomplete (passive diffusion). Furthermore, two islands in between the outfall and main river channel block the discharge from entering the main channel of the receiving water and reduce the likelihood of dilution with the receiving stream (see Figure 1). One small island is ten (10 feet) out from the shore at the discharge point and no receiving stream water was observed in this small side channel of the river during the January 17, 2008 inspection. No water quality-based effluent limits that utilize a mixing zone are proposed in this permit; no mixing zone is required.

E. Basis for WQBEL (Reasonable Potential and Calculations)

Pollutants typically present in municipal wastewater that may cause or contribute to a violation of water quality standards include conventional pollutants such as biological material (measured by BOD₅), suspended solids, oil & grease, *Escherichia coli* (*E. coli*) bacteria and pH; nonconventional pollutants such as chlorine, ammonia, nitrogen and phosphorus; and toxics such as metals and organics.

Effluent limits are required for all pollutants which demonstrate a reasonable potential to exceed numeric or narrative standards. The Department uses a mass balance equation to determine reasonable potential based on *EPA Technical Support Document for Water Quality based Toxics Control (TSD)* (EPA/505/2-90-001) Input parameters are based on receiving water concentration; maximum projected effluent concentration and design flow

of the wastewater treatment facility, and the applicable receiving water flow. Due to the lack of adequate effluent characterization data for potentially harmful or toxic constituents [metals (copper, lead and zinc)], ammonia and nutrients, the Department is unable to determine what effluent limits are necessary for these parameters at this time (see below). The Department is proposing effluent limits for certain conventional pollutants for which adequate data exists.

1. Conventional Pollutants

The facility provides a significant reduction in biological material and solids through secondary treatment (Section III). No additional WQBEL will be required for these parameters (BOD₅, TSS and pH).

Oil and Grease - The previous permit included an oil and grease instantaneous maximum limit of 10 mg/L. This limit will remain in the renewal permit. Quarterly monitoring for oil and grease will be required.

***Escherichia coli* (*E. coli*) Bacteria** - There were no effluent limits for pathogens in the previous permit, however, monthly monitoring for fecal coliform was required during the summer months (April through October). This renewed permit identifies pathogen limits to protect public health. Montana water quality standards were revised to replace fecal coliform bacteria with *E. coli* to reflect the latest federal guidance. The applicable standards for *E. coli* bacteria are:

April 1 through October 31 of each year - the geometric mean number of *E. coli* must not exceed 126 colony forming units (cfu) per 100 milliliters (ml) and 10% of the total samples may not exceed 252 cfu per 100 ml during any 30-day period [ARM 17.30.629(2)(a)]; and

November 1 through March 31 of each year - the geometric mean number of *E. coli* must not exceed 630 cfu per 100 ml and 10% of the total samples may not exceed 1,260 cfu per 100 ml during any 30-day period [ARM 17.30.625(2)(a)(ii)].

ARM 17.30.637(1)(d) requires that state waters, including mixing zones, be free from substances which create concentrations or combinations of materials which are toxic or harmful to humans. Based on the fecal coliform bacteria data in Table 2 it is unlikely the facility will meet the proposed *E. coli* limits in this permit without disinfection. To allow time for the facility to activate the existing chlorination system, *E. coli* limits are effective six (6) months after the effective date of this permit.

2. Non-conventional Pollutants

Total Residual Chlorine (TRC) – The instantaneous maximum limit for TRC in the current permit is 0.5 mg/L. The facility does not currently disinfect the effluent because there are no pathogen limits in the current permit. The facility may need to disinfect to meet new pathogen limits in this permit. In the event chlorination is used as a means of disinfection, the TRC effluent limits in this permit will be an average monthly limit of 0.011 mg/L

(chronic water quality standard) and a daily maximum limit of 0.019 mg/L (acute water quality standard). TRC limits do not apply if ultra-violet (UV) light is utilized for disinfection. TRC samples may be obtained immediately after the 60° V-notch weir or at the end of the man-made conveyance ditch before effluent enters the Yellowstone River.

Total Ammonia-N: - Total Ammonia-N limits are developed based on standards that account for a combination of pH and temperature in the receiving stream, the presence or absence of salmonid species, and the presence or absence of fish in early life stages. The Yellowstone River at Forsyth is a warm water fishery without salmonids present.

Oxidation ditches are generally very efficient in removing ammonia. There is a limited historic data set (May 1994 through September 1994) for ammonia effluent concentrations from the City of Forsyth oxidation ditch. The ammonia concentration during each of these five months was <0.1 mg/L. The City of Miles City operates an oxidation ditch and during the POR October 2002 through November 2007 the average effluent ammonia concentration, which includes summer and winter months, was 0.18 mg/L. The minimum and maximum ammonia concentrations were 0 mg/L and 2.1 mg/L, respectively, for 61 samples. The City of Colstrip also operates an oxidation ditch; for a limited data set (seven samples) the average effluent concentration was 1.13 mg/L. The minimum and maximum ammonia concentrations in the effluent were 0.1 mg/L and 6.2 mg/L, respectively.

Sufficient effluent data are not available to determine ammonia limits. Ammonia effluent data will be collected during this permit cycle. It will be used to determine if ammonia limits are necessary to protect water quality during the next permit cycle.

Nutrients (Total Nitrogen and Total Phosphorus) – There are no nutrient effluent data available to determine if nutrient limits are necessary in this permit cycle. Nutrient data collected during this permit cycle will be used to determine whether nutrient effluent limits will be required in the next permit cycle. It is likely that the dense vegetation and trees along the 1¼ mile long man-made ditch would utilize some nutrients in the wastewater before those potential pollutants reached the Yellowstone River. Therefore, sampling for nutrients may occur at the end of the conveyance ditch to characterize the concentration of total nitrogen and total phosphorus that is discharged to the Yellowstone River.

3. Toxic Pollutants

Metals - There are no effluent data available for metals (copper, lead and zinc) listed on the 2006 303(d) list, or any other metals, to determine if effluent limits for metals are necessary. Metals data will be collected during this permit cycle to determine if effluent limits will be necessary in the next permit cycle.

4. Whole Effluent Toxicity (WET) Testing Requirements

WET - ARM 17.30.637(1)(d) requires that state water be free from substances attributable to municipal waste that create conditions that are harmful or toxic to human, animal, plant or aquatic life, except the Department may allow limited toxicity in a mixing zone provided certain conditions are met (Part IV. D).

An assessment of toxicity in the effluent has not been performed at this facility. The permittee will be required to monitor potential toxicity in the effluent by means of acute WET testing [ARM 17.30.1322(6)(j)]. Acute WET testing of the effluent at Outfall 001 shall be conducted semiannually on two species during the permit cycle as described in the permit. The Department follows the EPA Region VIII toxicity policy (EPA, August 1997).

IV. Final Effluent Limits

Parameter	Units	Average Monthly Limit ¹	Average Weekly Limit ¹	Maximum Daily Limit ¹
Biochemical Oxygen Demand (BOD ₅)	mg/L	30	45	--
	lb/day	135	203	--
BOD ₅ Removal	%	85	85	--
Total Suspended Solids (TSS)	mg/L	30	45	--
	lb/day	135	203	--
TSS Removal	%	85	85	--
Total Residual Chlorine (TRC) ^{4,5}	mg/L	0.011	NA	0.019
<i>E. coli</i> Bacteria ^{2,5,6}	cfu/100mL	126	252	--
<i>E. coli</i> Bacteria ^{3,5,6}	cfu/100mL	630	1260	--
Oil and grease	mg/L	--	--	10
Footnotes: 1. See Definition section at end of permit for explanation of terms. 2. This limit applies during the period April 1 through October 31. 3. This limit applies during the period November 1 through March 31. 4. Sampling of effluent with analytical results less than 0.1 mg/L chlorine is considered in compliance with the chlorine limit. 5. Report Geometric Mean if more than one sample is collected in the reporting period. 6. Effective six (6) months after the effective date of this permit.				

pH: Effluent pH from Outfall 001 shall remain between 6.0 and 9.0 standard units (instantaneous minimum and instantaneous maximum) unless a variation is due to natural biological processes. For compliance purposes, any single analysis or measurement beyond this limitation shall be considered a violation of the conditions of this permit.

V. Monitoring Requirements

A. Monitoring Location(s)

Outfall 001 is located at the confluence of the man-made conveyance ditch and the Yellowstone River (N Latitude 46.27405, W Longitude 106.65537).

Effluent samples for all parameters, except TRC, total nitrogen and total phosphorus, must be obtained immediately after treated wastewater flows over the 60° V-notch effluent weir (see Figure 1). Since the man-made conveyance ditch is not considered state water, TRC, total nitrogen and total phosphorus samples may be obtained at the end of the man-made conveyance ditch before the discharge enters the Yellowstone River or immediately after the 60° V-notch effluent weir. If TRC limits are not met at the end of the man-made conveyance ditch the permittee will need to dechlorinate (or provide alternate disinfection).

E. coli samples should not be obtained at the end of the man-made conveyance ditch because it is unlikely with the large number of waterfowl using the man-made conveyance ditch that *E. coli* limits could be met. Samples for other parameters such as ammonia, nutrients, metals, volatiles and semi-volatiles must not be obtained at the end of the man-made conveyance ditch because these initial samples must reflect treatment occurring at the wastewater treatment plant and not be influenced by natural treatment that may or may not be occurring in the man-made conveyance ditch.

Influent samples must be taken at the influent manhole located 100 feet south of the oxidation ditch.

Analytical methods in 40 CFR Part 136 requires chlorine samples to be analyzed immediately. On-site sampling for TRC with a chlorine meter using an approved method is required. The method must achieve a minimum detection level of 0.1 mg/L. Sampling of effluent with analytical results less than 0.1 mg/L is considered in compliance with the chlorine limit.

Monitoring Requirements				
Parameter	Unit	Sample Location	Sample Frequency	Sample Type ¹
Flow	mgd	Influent	1/Week	Instantaneous
	mgd	Effluent	Continuous	Recorder ⁵
5-Day Biological Oxygen Demand (BOD ₅)	mg/L	Influent	3/Week	Composite
	mg/L	Effluent	3/Week	Composite
	% Removal ⁴	NA	1/Month	Calculated
	lb/day	Effluent	1/Month	Calculated
Total Suspended Solids (TSS)	mg/L	Influent	3/Week	Composite
	mg/L	Effluent	3/Week	Composite
	% Removal ⁴	NA	1/Month	Calculated
	lb/day	Effluent	1/Month	Calculated
pH	s.u.	Effluent	Daily	Instantaneous
Temperature	°C	Effluent	Daily	Instantaneous
<i>E. coli</i> Bacteria	cfu/100ml	Effluent	3/Week	Grab
Total Residual Chlorine (TRC) ²	mg/L	Effluent	Daily	Grab
Oil and Grease ⁶	mg/L	Effluent	1/Quarter	Grab
Petroleum Hydrocarbons ⁷	mg/L	Effluent	1/Quarter	Grab
Total Ammonia, as N	mg/L	Effluent	1/Week	Composite
Nitrate + Nitrite, as N	mg/L	Effluent	1/Month	Composite
Kjeldahl Nitrogen, Total, as N	mg/L	Effluent	1/Month	Composite
Total Nitrogen, as N ³	mg/L	Effluent	1/Month	Calculated
	lb/day	Effluent	1/Month	Calculated
Total Phosphorus, as P	mg/L	Effluent	1/Month	Composite
	lb/day	Effluent	1/Month	Calculated
Total Dissolved Solids (TDS)	mg/L	Effluent	1/Quarter	Composite
Dissolved Oxygen	mg/L	Effluent	1/Quarter	Grab
Whole Effluent Toxicity, Acute ⁴	% Effluent	Effluent	2/Year	Composite

Footnotes:

1. See Definition section at end of permit for explanation of terms.
2. The Permittee is only required to sample for TRC if chlorine is used as a disinfectant in the treatment process. If chlorine is *not* used, write "NA" on the DMR for this parameter.
3. Calculated as the sum of Nitrate + Nitrite (as N) and Total Kjeldahl Nitrogen (as N) concentrations.
4. See narrative discussion in Part IV.E.4 of permit for additional details.
5. Requires recording device or totalizer; permittee shall report daily maximum and daily average flow on DMR.
6. Use EPA Method 1664, Revision A: N-Hexane Extractable Material (HEM), or equivalent.
7. Use EPA Method 418.1, Infrared Spectroscopy.

Monitoring Requirements (Continued)				
Parameter	Unit	Sample Frequency ⁷	Sample Type ¹	ML
Antimony, Total Recoverable ²	µg/L	2/year	Composite	1
Arsenic, Total Recoverable ²	µg/L	2/year	Composite	1
Beryllium, Total Recoverable ²	µg/L	2/year	Composite	1
Cadmium, Total Recoverable ²	µg/L	2/year	Composite	0.1
Chromium, Total Recoverable ²	µg/L	2/year	Composite	10
Copper, Total Recoverable ²	µg/L	2/year	Composite	1
Lead, Total Recoverable ²	µg/L	2/year	Composite	1
Mercury, Total Recoverable ²	µg/L	2/year	Composite	0.1
Nickel, Total Recoverable ²	µg/L	2/year	Composite	10
Selenium, Total Recoverable ²	µg/L	2/year	Composite	1
Silver, Total Recoverable ²	µg/L	2/year	Composite	1
Thallium, Total Recoverable ²	µg/L	2/year	Composite	1
Zinc, Total Recoverable ²	µg/L	2/year	Composite	10
Cyanide, Total	µg/L	2/year	Grab	5
Phenols, Total	µg/L	2/year	Grab	10
Hardness, Total (as CaCO ₃)	mg/L	2/year	Grab	10
Volatile Organic Pollutants ³	µg/L	2/year ⁵	Composite	⁶
Semi-Volatile, Acid Compounds ⁴	µg/L	2/year ⁵	Composite	⁶
Semi-Volatile, Base Neutral ⁴	µg/L	2/year ⁵	Composite	⁶
Footnotes:				
1. See Definition section at end of permit for explanation of terms.				
2. Metals shall be analyzed as total recoverable, use EPA Method (Section) 4.1.4 [EPA 600/4-79-020, March 1983] or equivalent.				
3. 40 CFR 122, Appendix J, Table 2, use EPA Method 1624 Revision B, or equivalent.				
4. 40 CFR 122, Appendix J, Table 2, use EPA Method 1625 Revision B, or equivalent.				
5. Sampling required only in second and third calendar years after the effective date of the permit. This information will not be entered on the DMR form; a copy of the analytical laboratory report must be attached to the DMR for the applicable reporting period.				
6. See approved method for minimum level (ML).				
7. Samples must be collected in the first and third calendar quarters of the calendar year.				

B. Sludge Requirements

The facility utilizes drying beds before sludge is hauled to the Rosebud County Landfill near Colstrip for disposal. The Forsyth WWTP is authorized to dispose of sludge under

the EPA Region VIII General Biosolids Permit authorization (MTG650024). This MPDES permit will contain standard conditions requiring authorization under the EPA General Biosolids Permit for the disposal of biosolids.

C. Pretreatment Program

The facility is not currently operating under the EPA Pretreatment Program. The MPDES permit will include standard language restricting the introduction of certain pollutants to the Forsyth WWTP and require the facility to provide adequate notice to the Department for a new source, volume or character of industrial pollutants introduced to the system.

VI. Nonsignificance Determination

The nondegradation loads calculated in the previous permit will remain in the renewal permit so the discharge from the Forsyth WWTP does not constitute a new or increased source of pollutants pursuant to ARM 17.30.702(18) and a nonsignificance analysis is not required [ARM 17.30.705(1)].

VII. Other Information

On September 21, 2000, a U.S. District Judge issued an order stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment (WQLS), the State is not to issue any new permits or increases under the MPDES program. The order was issued in the lawsuit Friends of the Wild Swan v. U.S. EPA, et al. (CV 97-35-M-DWM), District of Montana and Missoula Division.

The Department finds that renewal of this permit does not conflict with Judge Molloy's Order (CV 97-35-M-DVM) because it is not a new permit and the permit does not authorize an increased load or discharge of pollutants.

VIII . Information Sources

40 CFR, Parts 122, 136, July 1, 2000.

ARM Title 17, Chapter 30, Subchapter 5 - Mixing Zones in Surface and Ground Water.

ARM Title 17, Chapter 30, Subchapter 6 - Surface Water Quality Standards.

ARM Title 17, Chapter 30, Subchapter 7 - Nondegradation of Water Quality.

ARM Title 17, Chapter 30, Subchapter 13 - Montana Pollutant Discharge Elimination System (MPDES) Standards.

DEQ. Circular DEQ 2, Design Standards for Wastewater Facilities. 1999.

DEQ. Circular DEQ-7, Montana Numeric Water Quality Standards. February 2006.

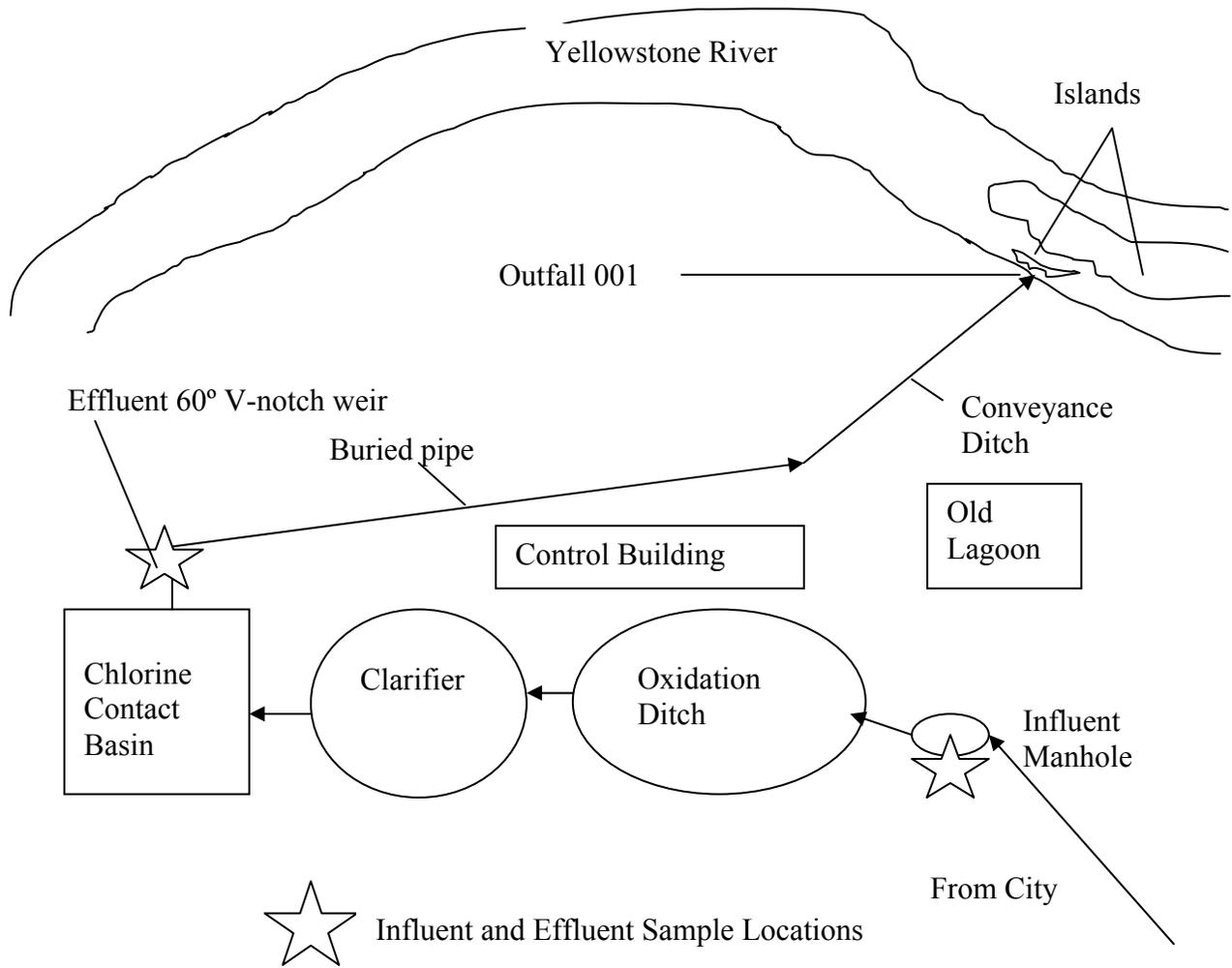
DEQ. Montana List of Water bodies in Need of Total Maximum Daily Load Development. 1996.

DEQ. Montana 303(d) List. A Compilation of Impaired and Threatened Water bodies in Need of Water Quality Restoration. Part A. Water Quality Assessment Results. 2006.

EPA. Office of Water, U.S. EPA NPDES Permit Writers' Manual, EPA-833-B-96-003. December 1996.

Prepared by: John Wadhams
Date: May 2008

Figure 1 – Sample Location



★ Influent and Effluent Sample Locations

(All effluent samples must be taken immediately after the 60° effluent weir, except TRC, total nitrogen and total phosphorus, which may be taken at the end of the man-made conveyance ditch or immediately after the 60° effluent weir. Influent samples must be taken at the influent manhole.)